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Transmission of Tuberculosis.—A statistical analysis of the notifications of tuberculosis in Worcestershire, England, during the three-year period, 1926 to 1928, shows the influence of sputum-positive or fatal cases as the source of secondary cases. The population of this area is 160,000, and the main industries are metal-working, textile manufactures, and agriculture. Notifications included 931 cases of pulmonary and 445 cases of nonpulmonary tuberculosis. Both groups were comparatively more prevalent among young adults. Contact is arbitrarily defined as house contact, work contact, and casual contact. During 1927 and 1928 there were 387 sputum-positive cases in the area described. They had house contact with 1.05 per cent and work contact with 6.75 per cent of the population area. Of 1,011 cases of definite notified tuberculosis 44.9 per cent of pulmonary type, 34.1 per cent of nonpulmonary type, and 41.8 per cent of all types had house contact with sputum-positive or fatal pulmonary tuberculosis. The 1,011 cases were tabulated by age-groups so as to show the number of cases presumably caused by house contact by each of 5 age-groups (5–15, 15–25, 25–35, 35–45, and 45 years and over) of primary infectious cases and also the number of cases presumably caused by infection by work and casual contact, for both pulmonary and nonpulmonary tuberculosis. Application of the percentages derived in this table to the notifications of tuberculosis in Worcestershire for the period 1926–1928, inclusive, gives two tables showing on the one hand the proportion of cases in each age-group of pulmonary notifications which are attributable to house infection by sputum-positive or fatal cases of phthisis belonging to one of the five age-groups, and on the other hand the proportions of nonpulmonary tuberculosis which show a history of exposure to infection by house contact with the five age-groups of primary infectious cases. By combining these two tables, a table results which shows the proportional amounts of all forms of tuberculosis in the correct age-group incidence for Worcestershire due to house-contact infection by sputum-positive cases of the five age-groups. From graphic expression of this table it is apparent that sputum-positive or fatal cases of phthisis of the age-group 25–35 years produce the greatest amount of secondary tuberculosis in the house-contact group. By using the number of infectious cases in each age-group as a denominator, with the secondary case-production due to the same age-group of infectious cases as a numerator, the comparative amounts of secondary tuberculosis are reduced to indices of secondary case-production by house contact per single infectious case in each age-group. These indices are expressed in tabular and graphic forms. The dangers of secondary case-production appear to increase with the age of the infectious case, probably because the chronicity of pulmonary tuberculosis tends to increase with an increase in the age at the onset of the disease. Deductions made from tabu-

lated data are as follows: Tuberculosis due to house contact is most likely to develop in cases 0–5 years old when the primary case is 25–35 years old, in cases 5–15 years old when the primary case is 35–45 years old, in cases 15–25 years old when the primary case is either 15–25 or over 45 years old, in cases 25–35 years old when the primary case is over 45 years old, in cases 35–45 years old when the primary case is 35–45 years old, and in cases over 45 years old when the primary case is either 15–25 or over 45 years old. The secondary case production in the home at different ages depends upon (1) the infectivity of the primary case, which is probably associated with its age; (2) the closeness of association between the primary case and its various age-groups of contacts represented by the other members of the household, which depends upon the age of the primary case; and (3) the numbers of each age-group in the household, which are in part governed by the age of any single member. The intention of this paper is to illustrate a method of statistical analysis rather than to emphasize the results obtained.—*The Sputum Positive or Fatal Cases of Pulmonary Tuberculosis as the Source of Secondary Cases of Tuberculosis, H. M. Turner, Brit. J. Tuberc., July, 1930, xxiv, 113.*—(*R. M. F.*)

Experiments on Route of Tuberculous Infection.—When the mode of infection in experimental tuberculosis in animals is alimentary, the disease produced is characterized by extensive lesions of the cervical and mesenteric lymph nodes, but when the respiratory tract is the route of infection the lesions are chiefly in the lungs and tracheobronchial lymph nodes. In studies previously reported tuberculosis was acquired by normal guinea pigs living in the same cage or in the same room with tuberculous animals under conditions approaching natural infection in man. In these experiments 45 guinea pigs have acquired tuberculosis. The disease involved the mesenteric nodes predominantly in the crowded ordinary cages. It was similarly, but less markedly, enteric in origin in the less crowded ordinary cages. In the more crowded special cages, with wire-mesh floors, in which the excreta were largely eliminated from contact with the animals, the mesenteric nodes alternated with the tracheobronchials in showing extensive disease. In the less crowded "special" cages a disease characterized by less or no affection of the mesenteric nodes and by extensive lesions of the tracheobronchial nodes was seen. Finally there was a massive tuberculosis of the tracheobronchial nodes with usually no affection of the mesenteric nodes in the frankly air-borne tuberculosis acquired by guinea pigs exposed in the same room but not to tuberculous cage mates. *Conclusions: 1:* In tuberculosis of guinea pigs acquired by contact with tuberculous guinea pigs under conditions permitting the entrance of tubercle bacilli both by way of the alimentary and of the respiratory tracts, the type of lesion produced depends upon the relative intensity of exposure to infection by one or the other channel. *2:* With the gradual elimination of exposure to alimentary infection tuberculosis is more and more completely grafted through the respiratory route. *3:* With the gradual increase in the intensity of exposure to alimentary infection, the disease becomes more and more completely enteric in origin. *4:* Some evidence is presented that the engrafting of tuberculosis by way of the alimentary route inhibits the development of respiratory disease.—*Experimental Epidemiology of Tuberculosis. The Route of Infection in Naturally Acquired Tuberculosis of the Guinea Pig, M. B. Lurie, J. Exper. Med., May 1, 1930, li, 769.*—(*J. S. W.*)

Air-Borne Contagion of Tuberculosis.—The following experiment was undertaken to obtain further information concerning the possibility of air-borne contagion of tuberculosis in animal rooms. In the main animal room of the Henry Phipps Institute (Philadelphia) two normal guinea pigs obtained from the Rockefeller Institute at Princeton were placed in each of 27 cages and left undisturbed. These cages were distributed evenly about the room which contained in all 270 metal cages, each housing 2 animals. The period of the experiment was two years and eight months. The tuberculous population of the room varied from time to time but there was always a considerable number of infected guinea pigs present. Also, one tier of cages was constantly occupied by tuberculous rabbits. The population of the 27 test cages was maintained constant throughout the period by replacing the dying animals with normal guinea pigs. During the entire period 103 guinea pigs were exposed in these cages. Of these, 58 died of other diseases, but 15 died of tuberculosis. The presence of tuberculosis was established on the basis of characteristic, unequivocal, tuberculous lesions with characteristic acid-fast bacilli in the smears of these lesions, and, in the case of the slightest doubt, the conclusion was tested by animal inoculation. The disease was characterized by a chronic course, a marked involvement of the lungs, often with cavity formation and a massive tuberculosis of the tracheobronchial nodes with the mesenteric and cervical lymph nodes

slightly or not at all affected. Hence the route of infection was almost always the respiratory tract. The distribution of mortality and morbidity from tuberculosis was more or less even over the entire room. The incidence of air-borne infection was increased by the duration of the exposure up to a certain point. None of the 15 guinea pigs exposed for a period of three weeks to six months developed tuberculosis. Of the 33 animals that were exposed from six months to one year, 3 developed tuberculosis. Of 18 guinea pigs that survived an exposure of one to one and one-half years, 5 developed tuberculosis. Of 17 guinea pigs exposed from one and one-half to two years, 6 developed tuberculosis. But, of 20 guinea pigs that survived an exposure of two years to two years and eight months, only 1 developed tuberculosis. The survival of the remaining 19 guinea pigs may have been due to an innate natural resistance to tuberculosis, or to an acquired immunity resulting from the continuous exposure to contagion. *Conclusions:* Of 103 guinea pigs living in the same room but not in the same cage with tuberculous animals for a prolonged period, 15, or 14.5 per cent, developed chronic tuberculosis affecting mainly the lungs and tracheobronchial nodes. The route of infection was almost always the respiratory tract and the incidence of disease increased with the duration of the exposure up to a certain point.—*Experimental Epidemiology of Tuberculosis. Air-Borne Contagion of Tuberculosis in an Animal Room, M. B. Lurie, J. Exper. Med., May 1, 1930, li, 743.*—(*J. S. W.*)

Effect of Crowding on Tuberculosis in Guinea Pigs.—In 1927 Perla reported that normal guinea pigs confined with tuberculous cage-mates occasionally acquired tuberculosis of alimentary origin, characterized by a marked involvement of the mesenteric and cervical lymph nodes. Guinea pigs confined in the same room with tuberculous animals but not in the same cage sometimes acquired a respiratory type of disease, characterized by extensive lesions of the lungs and of the tracheobronchial lymph nodes. The incidence of the disease increased with the intensity and duration of exposure. He also showed that guinea pigs inoculated intraperitoneally with tubercle bacilli often excrete virulent microörganisms in the faeces and urine during the first week after inoculation, and always in the last stages of disease. These studies by Perla have been continued by the writer and the results are reported herewith. To determine the effect of crowding upon the incidence of contact tuberculosis 72 guinea pigs were divided into 3 lots of 24 each. The first group was separated into 4 cages of 6 each, the second into 6 cages of 4 each, and the third into 12 cages of two each. The cages were of metal with wire doors and the floor of each cage measured 12 by 14 inches. Half of the guinea pigs in each cage were inoculated intraperitoneally with 0.000,01 mgm. of virulent human tubercle bacilli to serve as sources of contagion for the other half, the normal animals, or "contacts." For a control, 12 normal animals were placed in 4 cages to act as an index of the air-borne tuberculous contagion of the room. The cages were cleaned three times weekly. The population of the cages was maintained constant throughout the period of over a year, by replacing the dying animals, either the inoculated or the contacts, by similarly infected or normal animals. All surviving contacts were later tuberculin-tested and, if positive, killed and carefully studied. If there was the least doubt as to the presence of tuberculosis, culture and animal inoculation were done. None of the 12 controls used as index of the air-borne contagion of the room developed tuberculosis. In the 4 most crowded cages, in each of which there were 6 guinea pigs, 3 infected and 3 normal, 4 deaths with tuberculosis occurred. There was no direct correlation between the incidence of tuberculosis among contacts and the total number of tuberculous animals to which these were exposed. Where there were 4 guinea pigs per cage, 2 contacts developed tuberculosis. Not one case of contact tuberculosis occurred under the least crowded conditions, the third group. Undoubtedly, such variables as the native resistance of the individual guinea pig to tuberculosis, the quantity of bacilli absorbed and the intervals between absorption, and, possibly, the gradual immunization of some animals by repeated suitable "doses" may have influenced the incidence and course of the disease. In regard to the last possibility, it is noteworthy that of the 6 contacts that died of tuberculosis in these experiments, 5 died within the first seven months of exposure and the sixth died two months later. The route of infection in these guinea pigs was apparently largely enteric. Also in this article is reported a summary of the average duration of life and the incidence of chronic tuberculosis among 531 guinea pigs used in the above and other experiments. All had been inoculated intraperitoneally and distributed in groups of 1, 2 and 3 animals per cage, with an equal number of normal cagemates. The summary shows that the duration of survival is shortened among the more crowded animals, and the incidence of chronic types of tuberculosis is greater

among the less crowded animals.—*Experimental Epidemiology of Tuberculosis. The Effect of Crowding upon Tuberculosis in Guinea Pigs, Acquired by Contact and by Inoculation, M. B. Lurie, J. Exper. Med., May 1, 1930, li, 729.—(J. S. W.)*

Eliminating Tuberculous Enteric Contagion.—Guinea pigs exposed to tuberculous cage-mates under conditions of crowding may acquire a disease that is largely enteric in origin, the main source of contagion being the faecal matter of the infected animals. In the present study, one group of animals was confined in small cages so constructed that the excreta did not remain in contact with the occupants or their food. These cages had a wire-mesh floor (¼ inch mesh) through which the faecal boluses fell into a pan lying 3 inches below. The food was placed in metal cups attached to the door and walls of the cage. This group was compared with a similar group in ordinary small cages. Each group was divided to show two degrees of crowding. Where the crowding was 6 per cage, 3 inoculated and 3 normal, out of 24 exposed or normal guinea pigs, 7 developed tuberculosis in the ordinary cages and 5 in the special or wire-mesh floored cage. Where the crowding was 4 to a cage, 2 inoculated and 2 normal, 5 out of 24 exposed animals developed tuberculosis in the ordinary cages and 4 in the special cages. It was found, however, that the contacts that developed tuberculosis in the ordinary cages survived for a definitely longer period than the animals in the special cages. The reason advanced for this is that the disease acquired in the ordinary cage is largely of enteric origin and chronic in type, whereas the disease acquired in the special cages is of respiratory origin and has a more acute course. As in the previous experiments the population of all the cages was kept constant by replacing the dying animals, either the inoculated or the contacts, by similarly infected or normal animals. The present experiment continued for over a year.—*Experimental Epidemiology of Tuberculosis. The Effect of Eliminating Exposure to Enteric Infection on the Incidence and Course of Tuberculosis Acquired by Normal Guinea Pigs Confined with Tuberculous Cage Mates, M. B. Lurie, J. Exper. Med., May 1, 1930, li, 753.—(J. S. W.)*

Constitution and Tuberculosis.—The general physical constitution of a tuberculous patient permits one to draw certain conclusions as to his type of disease. The asthenic type shows, usually, a grayish-brown skin color, not infrequently with chloasmatic discolorations in the face. They have a hypersensitive muscular reaction towards mechanical irritation. The examination of the lung frequently reveals a juvenile emphysema, but the roengenological picture may show cavities. Extensive pleural adhesions are frequent; these individuals are subject to recurrent dry pleurisies. They are frequently the bearers of symmetrical indurations of the apices, with or without cavity-formation. The fermentative activity of the blood-serum in such cases suggests an increased activity of the thyroid and the chromaffine tissue. The findings confirm the evidence of a close relationship between hyperthyroidism and tuberculosis. It is quite likely that a tubercle-bacillus bacteriaemia produces impairment of the endocrine apparatus. If the bacillaemia does not lead to specific tissue changes, but only to nonspecific granulation tissue, the resulting clinical picture is that of Poncet's inflammatory tuberculosis. Individuals with this type of disease usually belong to the so called arthritic constitution. Arthritic lesions are probably produced by wedge-shaped necroses of the cartilages, following bacillary emboli. A third type of patients is characterized by a rosy skin and well-nourished appearance, the so called *beauté-phthisique.* They have long eyelashes, full eyebrows, and frequently lanugo hair over the back. These individuals are usually subject to a typical reinfection phthisis or to a chronic adolescent tuberculosis. It must remain an open question for the present time whether this particular physical type is more subject to tuberculosis or whether a tuberculous infection produces this type. Individuals with total erythrism do not appear to be more susceptible to tuberculosis than normally pigmented patients, but individuals with partial erythrism seem to be definitely more susceptible. These latter individuals are probably products of racial mixtures, which may explain their greater susceptibility. There is no evidence to assume that tuberculosis of the forebears has a harmful influence on the constitution of the offspring, at least not as far as tuberculosis mortality is concerned. The close observations of physicians and nurses who are constantly exposed to tuberculous infection will help to decide which constitutional types are more or less susceptible to the disease. It is the impression that asthenic-schizoid types are particularly susceptible. It is important in such examinations, not only to report the incidence of tuberculosis, but to observe the type and healing tendency of the disease.—*Tuberkulose und Konstitution. W. Neumann, Wien. klin. Wchnschr., January 9, 1930, xliii, 47.—(M. P.)*

Chest Wounds and Pulmonary Tuberculosis.—Of 50 cases of wounds of the chest (mostly war wounds) which have come under observation subsequent to injury with claims for compensation, 37 (74 per cent) had pulmonary tuberculosis. The wounds were of the penetrating type, and it would appear that these led to reactivation of a latent process. Certain of these injuries were themselves recovered from, and in others the bearer developed complications. In 33 of the 37, there was some degree of persisting incapacity. The time of onset of tuberculosis was often difficult to make out, but on the basis of "(1) location of disease and its association with the seat of injury; (2) the permanent impairment of function involved, accompanied by a tissue change which, owing to the nature of the organ in which it was taking place, allowed no complete physiological test; (3) often the retention of a foreign body, which necessarily was an irritating focus; it seems impossible to resist the conclusion that these conditions were factors of direct character in the development of active tuberculosis when eventually present." The incidence of pulmonary tuberculosis in all gunshot wounds of the chest is about 0.5 per cent This would be higher if only penetrating wounds were considered, as surface injuries appear to have little or no importance in the subsequent development of this disease. The period lapsing between injury and diagnosis of pulmonary tuberculosis averaged 11 years, with a maximal period of 13 years. In 6 the history was of continuous symptoms; in 24, of intermittent symptoms; and in 7, of considerable gaps.—*Trauma of the Chest in Relation to Incidence of Pulmonary Tuberculosis, G. B. Price, J. State Med., June, 1930, xxxviii, 311.*—(*H. S. W.*)

Trauma and Pulmonary Tuberculosis.—The author reports 5 cases in which a pulmonary process developed shortly after trauma. It is concluded that chest injuries, without breaking of the skin or rib-fractures, can activate latent foci, and that the disease process in the majority of cases develops upon the traumatized side.—*Beitrag zur Frage der Einwirkung des Brustkorbtraumas auf die Entwicklung der Lungentuberkulose, N. Gegetchkori and I. Gigineischwili, Zeitschr. f. Tuberk., 1929, liv, 45.*—(*H. J. C.*)

Tuberculosis among Workers in Sanatoria.—In order to study the problem of transmission between tuberculous patients and normal mature individuals, an attempt was made in the Chest Department of the Jefferson Hospital in Philadelphia, in which 75 per cent of the admissions suffer from far-advanced tuberculosis, to note the effects of association in a tuberculosis hospital on the health of the internes, nurses, and other workers. The investigation was restricted to a follow-up study of the workers after the termination of their service in the chest department. Points considered were the immediate influence of contact on weight, symptoms and intercurrent infection, the future occurrence of signs and symptoms suggesting pulmonary tuberculosis, and the possible factors in the resistance of the body to infection. The association of nurses with patients is closer and more continuous than that of other members of the staff, especially in the care of critically ill patients. It was found that in this follow-up study of 737 present and former workers, the incidence of tuberculosis acquired after termination of service was low (perhaps less than 2 per cent). The subject of hygiene is recognized generally as the most important factor in the prevention of tuberculosis, and was emphasized in the instructions given to nurses on entry in the department. The favorable influence of a high carbohydrate intake is also suggested.—*Tuberculosis in Workers after Residence in a Tuberculosis Hospital, B. Gordon and W. M. Cashman, J. Am. M. Ass., May 24, 1930, xciv, 1643.*—(*G. L. L.*)

Tuberculosis in Prisons.—As the result of the statistical examination of tuberculosis in prisons during the period of 1923 to 1927 there was found a decided decrease in those suffering with tuberculosis, in spite of the fact that the more exact examinations during the later periods should disclose a greater number than over the earlier period.—*Tuberkulose in Strafanstalten, M. Kallweit, Zeitschr. f. Tuberk., 1929, liii, 543.*—(*H. J. C.*)

Vitamine Deficiency and Experimental Tuberculosis.—The author studied the effect of vitamine deficiency, usually of single vitamine, upon the course of tuberculosis in rats. The rats were divided into 5 groups, one with normal nourishment, the second with a synthetic diet without vitamine A and D, the third without D and E, the fourth without C, and the fifth included the synthetic diet plus all the vitamine groups. The basic diet consisted of casein 18, dextrin 63, olive oil 8 and a salt mixture 4. The vitamine factors were added as (1) 20 mgm. of codliver oil, (2) 0.75 gm. of yeast and (3) 5 cc. of orange juice to every 100 gm. of basic diet. At intervals the animals were given a normal diet to avoid premature death during the experiment. Only young rats, weighing

from 50 to 75 gm., were used. It was found that the vitamine-deficiency animals were more susceptible to a tuberculous infection, in which A and C acted about equally and B deficiency was of less effect. Avitaminosis resulted in an earlier generalization, a more widespread process, a less favorable weight-curve and a diminished resistance to colds. After 15 weeks all the animals still living were examined. In the vitamine-A-deficient animals the pulmonary disease was less widespread than among the other animals. Examination of the blood, by means of the Wassermann tuberculosis test, revealed a negative reaction in the uninfected animals and a partially positive reaction in the infected animals, the outcome being dependent upon the extent of the foci.—*Versuche an Ratten über den Einfluss des Vitaminmangels auf den Verlauf der Tuberkulose, K. Hagedorn, Beitr. z. Klin. d. Tuberk., 1929, lxxii, 1.*—(*H. J. C.*)

Tubercle Bacilli in Hens' Eggs.—Avian tuberculosis is predominantly a bacteriaemia. Tubercle bacilli were found by cultural methods in the eggs of artificially infected hens after about the eleventh day. Positive findings were obtained in the egg-white in 8 and in the yolk in 5 of 12 eggs examined between the tenth and fourteenth day. Cooking for more than 5 minutes completely sterilized such eggs. As to the danger of tuberculous infection from eggs, there are only 22 cases of avian tuberculosis described in man, and only 12 of these were definitely avian on the basis of animal experiments. Avian tuberculosis in man tends toward a septicaemic spread, as is evident from the splenomegaly. The various symptoms are described and the use of avian tuberculin especially as a test.—*Untersuchungen über den Tuberkelbakteriengehalt des Hühnereies, Raebiger, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 209.*—(*H. J. C.*)

Tuberculosis Eradication Work in Cattle.—From July 1, 1929, to June 30, 1930, nearly 12,000,000 tuberculin tests were made on cattle in the United States, and of these, 206,764, or 1.8 per cent, reacted. Most of this work was done under the area plan which now involves about 1,200 counties. At present, 770 counties in 33 different states are classed as modified accredited. All of the counties in North Carolina and Maine are now so classified. The federal government has increased the maximal indemnity from $25 to $35 for grade cattle and from $50 to $70 for pure-bred cattle. In Canada definite data are not yet available, but, in general, very gratifying progress is being made all along the line. The Dominion Department of Agriculture is sponsoring considerable study and investigation.—*Report of Committee on Tuberculosis (Am. Veterin. Med. Assoc.), A. E. Wight, H. Caldwell, E. A. Watson, A. F. Schalk and J. Patterson, J. Am. Veterin. Med. Assoc., October, 1929, lxxv (n. s. xxviii), 485.*—(*H. S. W.*)

Economic Importance of Bovine Tuberculosis Eradication.—The values of tuberculosis-free herds and flocks is steadily increasing. In 1929, there were 51,000 fewer cases of tuberculosis found among cattle than among a corresponding number tested in 1921. There are now 1,000,000 fewer cows in the United States than there were in 1917, yet to-day dairy products are adequate for 18,000,000 more people than then. A few years ago the average cow produced a total of less than 4,000 pounds of milk yielding about 140 pounds of fat. Now she yields approximately 5,000 pounds of milk, giving nearly 200 pounds of fat. The cows in herd-improvement associations give an average of about 7,500 pounds of milk, yielding 290 pounds of fat. There has been a general increase in the amount of bovine products exported and in the amount consumed at home, largely through careful inspection service. There is also a greater value to the by-products, which includes more than one hundred pharmaceutical preparations.—*The Importance of Bovine Tuberculosis Eradication from an Economic Standpoint, Part 1, A. J. Glover; Part 2, W. T. Spencer, J. Am. Veterin. Med. Ass., March, 1930, lxxvi (n. s. xxix), 374.*—(*H. S. W.*)

Tuberculin Testing of Cows.—The demand for milk from herds free from tuberculosis is increasing. Tuberculin testing of cows is of prime importance in meeting this demand. Subcutaneous and intracutaneous tests are used. *Subcutaneous:* This test depends on the subcutaneous inoculation of dilute tuberculin in appropriate dosage, producing in the tuberculous animal a definite rise in temperature, reaching its maximum between the twelfth and eighteenth hours. A series of temperatures is taken at intervals of three hours, commencing with three preinoculation readings and ending at the twenty-fourth hour after inoculation. As an initial test this approaches 100 per cent accuracy. A thermal reaction may, however, be due to other causes. Also, the reaction in a tuberculous animal may be masked purposely by the subcutaneous inoculation of a large dose of tuberculin prior to the test dose, and such falsification cannot be prevented so long as

the sale of tuberculin is unrestricted. Further, repeated subcutaneous inoculations at regular intervals may result in some desensitization with masking of positive reactions. *Intraculaneous:* This method is generally used in the United States. The important modification herein described comprises a double inoculation of tuberculin, using the side of the neck. The thickness of the skin is measured and a sensitizing dose of 0.1 cc. of concentrated tuberculin is injected into the deeper layers of the skin. At the forty-eighth hour the site of inoculation is measured, and a second or diagnostic dose of 0.1 cc. is injected into the swelling produced by the first inoculation. Twenty-four hours later the swelling is measured and palpated. The tuberculous animal presents a diffuse, oedematous, tender swelling, which is in striking contrast to the hard, definitely circumscribed, painless swelling in the nonreacting animal. The accuracy of the test was confirmed by a comprehensive biological examination of a series of reacting and nonreacting animals. The modified test gives positive reactions in many animals having no reaction to subcutaneous tests. Retesting does not alter the clearness of each reaction, or cause sensitization. The elimination of doubtful reactions is facilitated by the use of tuberculin of known potency.—*Tuberculin Testing of Graded Herds of Cows, R. E. Glover, Brit. J. Tuberc., April, 1930, xxiv, 75.*—(*R. M. F.*)

Experimental Johne's Disease.—Intraperitoneal inoculation of the Johne bacillus in large doses into guinea pigs is followed by the development of nodular and diffuse reactions quite suggestive of tuberculosis. Caseation is frequently present, especially in the diffuse plaque-like areas of reaction, and this tissue usually contains large numbers of acid-fast bacilli, even in lesions six months after inoculation. Many bacilli are often present in giant cells which are situated in both nodular and diffuse areas. When smaller doses are employed, the reaction is similar but smaller, there is less caseation, and fewer bacilli are detectable. Although acid-fast bacilli are present sometimes in huge numbers, none could be grown on culture of lesions (4 to 6 months old) containing them. Injection of heat-killed cultures produced similar lesions, just as do similar cultures of tubercle bacilli or timothy bacilli and as does the wax from tubercle bacilli. These lesions do not represent true infection of the animal. The rôle which the omentum plays in causing a grouping of bacteria and foreign matter is important. —*The Lesions Produced by the Johne Bacillus of Disease in the Peritoneal Cavity of the Guinea Pig, W. A. Hogan and Harriet L. Mansfield, J. Am. Veterin. Med. Ass., February, 1930, lxxvi (n. s. xxix), 182.*—(*H. S. W.*)

Hepatic Infection in Johne's Disease.—This represents the case reports of two head of cattle that were killed because of Johne's disease. In each, typical enteric evidence of the disease was found, but, in addition, the liver in each case revealed many small focal lesions. These were like tubercles in that they consisted of giant cells, "proliferated reticulo-endothelium," and lymphocytes. They were not caseous, and they contained very few acid-fast bacilli, although the areas of disease in the intestines and tributary lymph nodes contained many of them.—*Liver Lesions in Johne's Disease, F. P. Mathews, J. Am. Veterin. Med. Ass., February, 1930, lxxvi (n. s. xxix), 248.*—(*H. S. W.*)

Avian Tuberculosis in Nebraska.—The production of poultry in Nebraska has increased very greatly within the last decade, so that poultry raising has become one of the very important industries of the state, as it has indeed in the entire corn belt. Numerous diseases of fowl, among them tuberculosis, have crept into many flocks because, as yet, but little has been done by the farmer or poultryman in the way of hygienic and sanitary management of the flocks. Previous testing (1927) revealed one incidence of about 9 per cent of reactors. Of all reactors, those less than one year old had a definitely lower incidence of infection. Of 3,515 condemned birds, 79.3 per cent were passed for food at autopsy, although 95 per cent of all slaughtered fowls showed lesions at autopsy, the latter being present particularly in the liver, spleen, intestines and lungs in the order named. Many of the fowls condemned had generalized tuberculosis, but were in good flesh and would not have been deemed sick from examination. Practical difficulties cause one to feel that, under existing conditions, it is probably unwise to apply the testing of fowls in the widespread way in which it is applied so profitably in cattle. The first attack must be to reduce the mass of infection. This can be readily done by killing or marketing the older stock and observing rules of good sanitation. Hens should be eliminated from any flock by the age of two years and from infected flocks not later than at the age of one year This would be economical, because of the reduction in egg production after one year of life. Sanitary measures should include rotation of poultry yards and clean water and food.—*Avian Tuberculosis in Nebraska,*

C. H. Hays, J. Am. Veterin. Med. Ass., November, 1929, lxxv (n. s. xxviii), 549.—(H. S. W.)

Avian Tuberculosis in Dogs.—The literature reveals no instance of tuberculosis in dogs caused by the avian tubercle bacillus. There are 72 cases reported of spontaneous tuberculosis in dogs, doubtless mostly of urban dogs without the opportunity of contact with avian bacilli. Does the dog naturally resist this type of bacillus? Fifty-four dogs with negative tuberculin test were exposed to avian tubercle bacilli by various modes of inoculation and by feeding of tuberculous chicken and swine offal. After one year the animals were killed. This well-controlled work yielded the conclusions that the dog is extremely resistant to avian tuberculosis; that dogs inoculated intraperitoneally or intrabronchially showed no signs of disease; that of about 30 dogs which ingested tuberculous material, two showed a few microscopic lesions suggestive of tuberculosis; that, of 10 dogs given avian bacilli intravenously, one showed fairly typical tuberculosis with acid-fast bacilli,—one of these dogs eliminated avian bacilli in the urine; that 6 dogs given intracerebral inoculation all developed "tuberculous reaction in the brain and liver," but none in the lungs—all died within 29 days; finally, that avian bacilli in the ingestion experiments passed through the animals in a viable state and were recoverable from the fourth to the seventh day afterward (record on only one dog).—*The Pathogenicity for Dogs of Bacilli of Avian Tuberculosis, W. H. Feldman, J. Am. Veterin. Med. Ass., March, 1930, lxxvi (n. s. xxix), 399.*—(*H. S. W.*)

Tuberculosis in Apes.—The intestinal tract is more frequently the portal of entry than the lungs in apes. The author reports on macacus, mandriks and pavian. There is a relation between the macacus tuberculosis and that of human beings on account of the agglutinating relation of their blood groups. Among apes of the new world (*Cebedis*) tuberculosis is rarer than among those of the old world.—*Vergleichende pathologische Anatomie der Lungentuberkulose der Affen in Zusammenhang mit der stammesgeschichtlichen Entwicklung des Entzündungsvorganges, W. H. Stefko, Virchow's Arch., 1929, cclxxii, 272.*—(*H. J. C.*)

Tuberculosis in Apes.—Death from tuberculosis in apes in zoological gardens is not frequent. Among 102 apes sectioned, only 8 revealed tuberculosis and in 6 of the cases there were widespread changes in the lungs, lymph nodes, liver and spleen. The changes were of a diffuse caseous type. Contagion exists in cages but not in the open. Psychic symptoms, loss of interest and loss of desire to play appear before physical signs. Fever is the most significant symptom. The method of spontaneous infection is not definitely understood, although it is believed that the lungs are the first site of location of the tubercle bacilli while the intestinal tract as the portal of entry plays a rôle only in exceptional cases.—*Über die Spontantuberkulose der Affen, H. Kalbfleisch and A. Nohlen, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 336.*—(*H. J. C.*)

Chest of Newborn Infant.—The chests of 159 infants were roentgenographed within forty-eight hours of birth. The films of 96 infants, 39 males and 57 females, were measured. The average thoracic width for all babies was 9 cm., and the males were slightly larger than the females. The average length was 5 cm., the males again being slightly larger. In both the male and female infants the width of the cardiac shadow was 5 cm. The ratio of the transverse diameter of the heart to that of the chest was in the males as 5:9.1, and in the females as 5:8.9. Roentgenograms taken ten days after birth revealed that no appreciable change took place in the contour of the chest or heart in this time. It was possible to restudy some of the infants after a lapse of six months. In these, the most striking finding was the similarity in the configuration of the thorax and thoracic organs to that seen in the same infant at birth.—*The Roentgen Appearance of the Chest of the Newborn Infant, J. T. Farrell, Am. J. Roentgenol. & Rad. Ther., August, 1930, xxiv, 140.*—(*W. I. W.*)

Infantile Pulmonary Tuberculosis Due to Unusual Tubercle Bacillus.—A little girl, in every respect normal at birth, was fed artificially after the third day. At the age of five weeks she was found to have become pale, and had symptoms of a moderately severe cold. At the age of eleven weeks she had a fever and cough of three days' duration. The temperature was 101. There were dulness and bronchial breathing over the right upper lobe. The signs remained the same for two weeks, at the end of which time X-ray examination revealed extensive consolidation of the entire right lung, the uniform smoothness of the shadow and the displacement of the heart and trachea to the left strongly suggesting the presence of liquid. Thoracentesis produced only a very small amount of fibrous material, smears of which contained innumerable granular acid-fast rods. The temperature and other physical signs re-

mained the same. A smear of the sputum at this time showed large quantities of the same bacilli as those obtained in the pleural liquid. A scratch tuberculin skin test was negative. But there was a slightly positive reaction to 0.1 mgm. of Old Tuberculin given intracutaneously. Thorough examination of the child's parents and attendants did not reveal evidence of tuberculosis. At the age of five and one-half months the fever disappeared, though the signs in the chest were still marked. The X-ray showed some mottling, but considerable resolution on the right side, and some "feathering" of the left upper lobe. The patient's general condition improved steadily. At the age of twenty-two months there was still evidence of hilum lymph-node enlargement, but the lung signs had entirely disappeared, and the patient was clinically well. The smear of the exudate obtained by the needle contained numerous long, curved, acid-fast rods. On blood-agar plates incubated aerobically for forty-eight hours, these organisms grew in small yellowish-white colonies, paste-like, yielding rods that stained granularly by Gram and acid-fast by Ziehl-Neelsen. A guinea pig, inoculated with direct exudate, showed no tuberculosis in seventy-five days. A guinea pig, inoculated with a small amount of the culture and killed in seventy days, showed caseous tuberculosis. Smears from the lesions of the lymph nodes at the site of inoculation showed acid-fast rods. Petroff injected a culture of the organism into mice, guinea pigs, chickens, and rabbits. All gave negative results except the rabbit into which the injection was made intravenously. After fifty-five days it was killed and three small foci containing acid-fast granules were found in the left suprarenal gland. The organism was thus only mildly virulent in animals easily susceptible to human tuberculosis, but in this sensitive child it was pathogenic enough to produce the pulmonary changes described. It may be one of a group with the avian bacillus, becoming virulent when it is associated with the human or the bovine tubercle bacillus. It is possible that some of the infants who have recovered from tuberculosis have been infected with this particular strain of the tubercle bacillus.—*Infantile Pulmonary Tuberculosis Due to an Unusual Type of Tubercle Bacillus, P. W. Beaven, Am. J. Dis. Child., June, 1930, xxxix, 1270.*—(*P. J. W.*)

Tuberculous Infection in Childhood.—A study of earlier and more recent literature on tuberculin tests in children indicates that considerable caution must be exercised in the interpretation of results; for often the noncontact controls have been children brought to the clinic because of suggestive symptoms, or even because of manifest tuberculosis; and a large proportion of the contact cases have attended only because of exposure, without statement of whether they have been exposed to open or to healed tuberculosis. The present investigation is of 118 children of the London hospital class, coming from tuberculous households. Cases of suspected or of definite clinical tuberculosis have been excluded both from the series of home-contact children, and from the control series of noncontacts. Thus the potency of contagion in the home in producing infection is best estimated. The 118 children were aged 0–15 years, 94 being less than 11 years old. They were brought to the hospital because of exposure, or for some nontuberculous complaint. This series was compared with 513 clinically nontuberculous children of the same class and district, but whose homes were free from tuberculosis. Their ages were 0–15 years (438 being under 11 years of age); they were tested over the same period (one year, 1929) by the same observer. Of the 118 children under 16 years, 87 were home-contacts of a relative who had pulmonary tuberculosis. In 50 of these cases (42 under 11) tubercle bacilli were present in the sputum. In the remaining 37 cases (26 under 11) the sputum result was negative or not known. Thirty-one children under 16 (26 under 11) were home-contacts of a relative who had nonpulmonary tuberculosis. Comparing the results of the pulmonary contacts in the different age-groups, with those of the noncontact controls of the same age, the incidence of infection increases from infancy to adolescence in both the home-contact and the noncontact series, but the curve of the home-contacts runs above that of the noncontacts up to the age of 16. In other words, most of the tuberculization of home-contacts takes place in infancy and early childhood, that is, in the home environment; whereas at the present day, most of the infection of noncontacts is received in middle and later childhood and in adolescence, that is, during a period when the principal activities of the individual are away from home. Both groups, however, are tuberculized to the same extent when adult life is reached. Of the 68 children aged 0–10 years, who were home-contacts of pulmonary tuberculosis, 59 per cent reacted positively to tuberculin (0.1 mgm. O. T. intracutaneously) as compared with 18 per cent of 438 noncontacts of the same age. It should be noted that positive reactions were obtained in 42 per cent of home-contacts of pulmonary tuberculosis with negative or unknown sputum result, and in as many as 69 per cent of

home-contacts of pulmonary tuberculosis with known positive sputum. Four-fifths of the pulmonary home-contacts were bedroom contacts. The percentage of tuberculin reactions among children exposed in tuberculous households to relatives with nonpulmonary tuberculosis appears to be no higher than that among children of nontuberculous households. There is no reason for assuming the existence of inherited predisposition.—*Human Contagion and Tuberculous Infection in Childhood, B. Schlesinger and P. D. Hart, Arch. Dis. Childhood, June, 1930, v, 191.*—(*P. J. W.*)

Sources of Infection in Meningitis and Miliary Tuberculosis in Childhood.—Among 43 cases of miliary tuberculosis or meningitis terminating fatally in children under 10 years of age, there were 27 with evident family infection and, of these, 22 had either parents or grandparents as the source. The author believes that family prophylaxis comes first in these cases, but he does not exclude the extrafamily hazards, which should also be protected against.—*Ermittelungen über die Infektionsquelle bei Todesfällen an Meningitis und Miliartuberkulose im Kindesalter, E. Frantz, Zeitschr. f. Tuberk., 1929, lii, 501.*—(*H. J. C.*)

Children in Tuberculous Households.—In reply to Dr. Midgley Turner's criticism of the report on "The Fate of Young Children in Tuberculous Households" published in the August, 1929, issue of *Tubercle,* Dr. Cox states that the low mortality in the first year of life of children in tuberculous households, compared with the general population, is not maintained in the succeeding years of life, and that the mortality especially from tuberculosis, in later years, is significantly higher than in those among the "control" population.—*The Fate of Young Children in Tuberculous Households, G. L. Cox, Tubercle, July, 1930, xi, 447.*—(*M. E. P.*)

Tuberculosis in Children.—There has been a decline in the mortality from pulmonary tuberculosis during 73 years from 395 to 58 deaths per 100,000 persons in Massachusetts. Opportunity is at present provided for about 4,000 tuberculosis patients in institutions, but long waiting-lists indicate that more beds are desirable. The Chadwick Diagnostic Clinics were organized with the idea that prevention is better and less expensive than cure. From the finding of childhood tuberculosis the source of infection may be discovered and further spread stopped. Our knowledge of the clinical, pathological and roentgenographic aspects of childhood tuberculosis has been materially increased by Opie, Chadwick and McPhedran. *Incidence and Sources of Infection:* The tuberculin test has revealed about 28 per cent of 100,000 children infected. About 302,000 infected children may be estimated for the state. There appears to have been a decline since Bartlett's limited survey in 1917 in Framingham. Tuberculosis of the childhood type has been demonstrated in 2,497 children during the first five years of the Chadwick Clinics, and about 21,000 cases may be estimated among the children of the state. Suspicious cases number 5,369, or 54,000 for the child population. Tuberculosis of the adult type was found in 98, or an estimated 1,000 for the state. The childhood type of disease is largely due to domiciliary infection, occurring twice as often in Massachusetts with known exposure, while Opie and McPhedran found the more severe types of tracheobronchial involvement seven times as numerous in contact families. Rathbun discovered certain or probable pulmonary tuberculosis in the parents of 71 per cent of unselected tuberculous children, whereas the normal adult incidence is only 1 per cent. The importance of infection from bovine sources is difficult to estimate but probably less than from human. In Massachusetts 25 per cent of untested cattle are estimated to be tuberculous and about 70 per cent of the milk is pasteurized. Possibly 1,000,000 persons are exposed to potentially tuberculous milk. *Relation of Childhood to Adult Tuberculosis:* The observations of Chadwick, Opie, Landis, McPhedran and Hetherington, and Rathbun indicate that from one-third to one-half of those developing adult tuberculosis have X-ray evidence of preceding childhood infection. The lymph-node lesion may be calcified when the apical (or subapical) is caseous. It may also be in the opposite lung. Further observations should be available through the Chadwick Clinics. *Pathology and Symptomatology:* In the childhood type of tuberculosis the primary focus is not predominantly apical, but may be anywhere, associated with involvement of regional lymph nodes. Secondary infection does not involve the nodes. Both cavity-formation and fibrosis are uncommon in the childhood type, but caseous and calcified lesions predominate. Extensive pulmonary lesions are usually bronchopneumonic, but at times the acute lobar and miliary forms are seen. During the first year of life caseation is usually progressive. There are no pathognomonic symptoms and lesions may progress without symptoms. Painless pleural effusions are sometimes observed. Tracheobronchial lymph-node involvement is recognized in the X-ray films by the presence of

areas of increased density 1 to 3 cm. in diameter, of irregular outline and uneven granular appearance due to calcium deposition. Lymph-node involvement cannot usually be identified unless the masses are large. Associated pulmonary lesions appear as mottling, while retrogression of such lesions may leave calcified spots or strands. Recognition of the condition depends chiefly on the tuberculin reaction and the X-ray findings. In some types a history of exposure and grouping of symptoms are highly important. The prognosis depends in large measure on the amount of infection and the possibility of eliminating further infection and establishing a favorable environment. Children in whom the only evidence of infection is a tuberculin reaction need no special care. Those with definite pathological changes, but apparently normal, may require special-privilege classes, open-air and open-window schools, preventorium care or its equivalent. Opportunity to rest during the day, extra feeding, fresh air, sunlight and avoidance of strenuous exercise are necessary. Open-air classes are now held in seven cities and towns of Massachusetts. Those with evident childhood tuberculosis should be segregated in special open-air rooms or schools. For active, progressive or extensive tuberculosis, sanatorium care is desirable unless equally good or better facilities are to be had at home. There are at present 290 beds for childhood tuberculosis at Westfield and the same number at North Reading State Sanatoria, 12 at the Bristol and 25 at the Plymouth County Sanatorium, or 617 in all. There are, however, only about 100 beds for children with adult tuberculosis, as against an estimated 1000 such cases. These need to be increased. —*Childhood Tuberculosis, F. T. Lord, New England J. M., July 10, 1930, cciii, 68.*—(*A. P.*)

Tuberculosis in Children.—This is one of the serious diseases of children, causing the death of more boys and girls under fifteen than the acute exanthemata, and crippling or incapacitating many others. Many children are infected and mild disease develops with such slight signs and symptoms that it may go unrecognized for years. More than half the adolescent cases of pulmonary tuberculosis have had a preceding childhood type and the most favorable time for treatment has passed unnoticed. Up to fifteen years tuberculosis heads the communicable disease mortality and continues to lead the rest up to forty. The incipient childhood forms are recognizable and the National Tuberculosis Association has adopted the term "childhood type of tuberculosis" to describe the diffuse or nodular lesions in the lung and associated lymph nodes that result from a first infection. *Sequence of Events: 1:* Formation of one or more tuberculous foci within the parenchyma, usually adjacent to the pleura, with central caseation. *2:* In unfavorable cases, peripheral spread and invasion of large areas. In favorable cases, fibrous circumscription. *3:* Deposition of calcium in the caseous core. Similar changes occur in the regional lymph nodes draining the diseased area. The X-ray evidence may vary according to the phase of the process and time of taking the film. In some cases excavation of the caseous centre occurs. *Difference between Childhood and Adult Types:* A tuberculous nonapical lesion, even without demonstrable tracheobronchial lymph-node enlargement, should be considered as the childhood type unless there is evidence of an older focus. Healing by resolution occurs more often than in the adult type, leaving trivial or no scars except for calcification of caseous foci. The prognosis is good. *Diagnosis:* This depends on consideration of history, symptoms, signs, tuberculin test, X-ray evidence and exclusion of other causes. In the history, intimate contact with a known pulmonary case is most important. Among the symptoms undue fatiguability ranks first. Cough is not a constant symptom and is not present after the perifocal inflammation has absorbed or in the purely tracheobronchial lymph-node type. Fever is uncertain, partly because of the normal instability of a child's temperature, which may occasionally go to 100° F. by mouth and yet be within normal range. Pleuritic effusions are rather frequent and ushered in by a sudden rise in temperature without pain. Auscultation and percussion reveal only diffuse pulmonary infiltrations or greatly enlarged lymph nodes or consolidations. A positive tuberculin test is important and the Mantoux or intracutaneous test is slightly more accurate than the Pirquet or cutaneous. X-ray examination is indispensable. The density of the shadow cast by diseased nodes depends chiefly on the degree of calcification. During the caseous stage they can rarely be differentiated. Perceptible nodular or hilar lesions other than those due to tuberculosis are rare. Ill-defined blurring and broadening of the hilar shadows is usually due to faulty technique. The parenchymal lesions must be differentiated from those of acute and chronic nontuberculous infiltrations, and here the onset and development of symptoms and history of antecedent infections are helpful. Lesions of the upper respiratory tract may be associated with chronic

nontuberculous infiltrations. Rounded calcified masses projecting from the hilum or mediastinum are nearly always due to tuberculosis. The thymus shadow is not rounded. Hodgkin's disease will occasionally come into question. *Treatment:* It is most important to prevent further infection. Other than this, the essentials are rest, fresh air, proper nourishment and sunlight. When these are not obtainable at home, institutional care is advisable. Only children with pulmonary infiltrations need be excluded from school. Open-air rooms, summer camps and preventoria are all helpful, as is the removal of physical defects which retard growth. However, those with pulmonary infiltrations should not be subjected to tonsillectomy, as it may activate their disease. *Prognosis:* Unless there is extensive pulmonary infiltration stoppage of further infection will permit the majority to overcome the infection already present. However, these lesions are a source of danger during adolescence, at which time many break down with pulmonary tuberculosis. From one-third to one-half of adult pulmonary cases in adolescents show evidence of preceding childhood disease in the form of calcified foci. Boys and girls under twenty with such lesions should avoid strenuous exercise and competition unless their tuberculin reaction is negative and contact has long ceased. *Summary:* The childhood and adult types of pulmonary tuberculosis are distinct. The former develops on nonsensitized tissue and spreads through the lymph channels, whereas in the latter spread is by continuity or aspiration, or haematogenous. Tuberculous lesions in a child are a source of danger throughout adolescence and early adult life, although apparently retrogressing or calcifying. Protection must continue through these years.—*Tuberculosis in Children, H. D. Chadwick, New England J. M., May 29, 1930, ccii, 1044.*—(*A. P.*)

Pulmonary Retraction with Cardiac Displacement in Childhood.—Widespread pulmonary shrinking, with high-grade shifting of the mediastinum and its organs, is not rare in childhood. The factor responsible is not always tuberculosis, even though frequently cirrhotic tuberculosis forms the basis. Nonspecific inflammatory processes in the lung following infectious diseases and croupous pneumonia play a rôle. The contractions of tuberculosis are mostly found in the upper lobe, while the pneumonias as a rule affect the basal parts of the lung. The shifting of the mediastinal organs depends, in the first place, upon the retraction of the lung as the result of a diminution in its volume as well as vicarious emphysema in the healthy lung and, finally, pleuritic adhesions. The symptoms in children are slight. With left-sided contractions there is a twisting of the large vessels, with consequent circulatory disturbances. The chest is always markedly deformed.—*Lungenschrumpfung mit Herzverlagerung im Kindesalter, Anne Hecker, Beitr. z. Klin. d. Tuberk., 1929, lxxii, 85.*—(*H. J. C.*)

Hilar Shadows in Tuberculin-Negative Children.—More or less transitory roentgenological shadows in the hilar region are not uncommon in tuberculous children. They are referable to the caseation of intrapulmonic lymph nodes or to primary foci near the hilum, or, if transitory, to parenchymatous infiltrations, to interlobar or mediastinal exudates. It is quite rare, however, to observe similar shadows in children who do not react to tuberculin. Such children suffer usually from cough, they are febrile, and they have poor appetite. The physical findings are negative, or a circumscribed area of dulness may be found parasternally with bronchovesicular breath-sounds, and, at times, the signs of a diffuse bronchitis exist. These shadows in tuberculin-negative children disappear faster than identical shadows in tuberculin positive children. Four cases of this type were observed and are briefly reported. Clinical and roentgenological findings in these cases are consistent with their tentative interpretation as pneumonic (nonspecific) infiltrations in the hilar regions.—*Transitorische Hilusschatten bei tuberkulinnegativen Kindern, K. Dietl, Wien. klin. Wchnschr., July 3, 1930, xliii, 840.*—(*M. P.*)

Children in Families with Open Tuberculosis.—Children living in families with open tuberculosis die more frequently than those in nontuberculous families. The greatest hazard exists in the first year of life and between 11 and 20 years. The hazard is less between the second and tenth years, although children infected during this period have a mortality three times as great as in the general population. It is not necessary to overstress the care of small children and during the first school years, even though this is essential, but the period from 12 to 20 years requires special attention. Girls show an increased mortality at ages 5 to 20 years. The more marked the exposure the greater the morbidity and mortality. Among 119 girls suffering marked exposure between the 11th and 20th years, there were 14 per cent that died in the 7.2 years following exposure. Vaccination is not considered to have given conclusive results in children.

Tuberculin treatment may be dangerous in causing flare-ups. To discover disease in children from tuberculous families it is essential to examine all between the ages of 3 and 12 years once or twice yearly, and between birth to 2 years and 14 to 25 years at least three to four times a year by fluoroscopy and, in the case of suspects, with roentgenograms. With marked exposure frequent roentgenograms are advised. Thus the tuberculosis mortality among children can be markedly reduced and, as with leprosy, it can be uprooted.—*Das Schicksal der Kinder, die mit einem offentuberkulösen verwandten die Wohnung teilen, und seine Beeinflussung durch den Arzt, H. Braeuning and Margarete Neumann, Zeitschr. f. Tuberk., 1929, liii, 385.*—(*H. J. C.*)

Moro Reaction in School-Children.—In order to determine the amount of infection among school children those in the vicinity of Oldenburg were tested by the Moro inunction method. Of 6,101 children, 80 per cent were submitted to the test, and of 4,774 tested 1,170 were positive, 168 questionable and 3,467 negative. In the urban schools there were 30.3 per cent and in the rural schools 22.6 per cent positive. The periods of the war gave the highest reaction. The sources of infection were extrafamily in 1.4 per cent of the boys and 3.6 per cent of the girls, and intrafamily in 9.6 per cent of the boys and 10 per cent of the girls; and unknown in 89 per cent of the boys and 86.4 per cent of the girls. Of all the tuberculin-positive children there were only 86 cases with active tuberculosis, and 8 with a bronchial lymph-node tuberculosis, 35 pulmonary tuberculosis, 36 scrofulosis, and 6 with bone and joint or other tuberculosis. The object of the tests was to determine how many Moro positive children would later develop tuberculous disease.—*Über die Mororeaktion bei den Schulkindern des Kreises Oldenburg, Simon, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 692.*—(*H. J. C.*)

Chest X-Rays of Nontuberculous Children.—Roentgenograms of the chest were carefully studied in a series of 93 children, referred because they had symptoms suggesting tuberculosis or were regarded as possible contact cases. This series was selected from a larger group because of no reaction to tuberculin skin tests, indicating that no previous tuberculous infection existed. The conclusion after study of the films was that children without acute illness and giving a negative tuberculin reaction may show single or multiple, large or small axial vessels in the hila, multiple axial vessels up to 2 or 3 mm. in diameter in the lung tissue, localized increased lung markings, localized pleural thickenings, or none of these shadows. It is therefore apparent that a diagnosis of tuberculosis of the mediastinal lymph nodes or lung tissue cannot be based on these observations. No calcifications, lymph-node tumors or localized pulmonary infiltrations were found, and no definite correlation was found to exist between the positive roentgen observations and the clinical history.—*Chest Roentgenograms of Nontuberculous Children Suspected of Being Tuberculous, E. Wolff and R. S. Stone, J. Am. M. Ass., February 15, 1930, xciv, 458.*—(*G. L. L.*)

Nonpulmonary Tuberculosis and Milk Control.—Despite the gratifying reduction in tuberculosis mortality of late years, a reduction of one-fourth from 1898 to 1908, one-third from 1908 to 1918, and one-half from 1918 to 1929, with a recent bulletin from the Metropolitan Life Insurance Company for the first quarter of 1930 showing a rate of 65.3 per 100,000, the lowest recorded among white policy-holders, we are still confronted with the disquieting fact that in the age period from 15 to 39 tuberculosis still stands as the major cause of death, especially in women. Also, while there were 78,063 fewer births in the registration area of the United States in 1929 than in 1928, including Massachusetts, the death-rate was not correspondingly reduced. We may reasonably hope that the State Ten Year Program may help meet the menace of tuberculosis developing during the most productive (and reproductive) period. It is common knowledge that tuberculous infection may, in a large proportion of cases, take place early in life and this program means an all-inclusive study of school children to ascertain the extent of both latent and active tuberculosis among them. Mild infections can often be cured if the spark is not fanned into a flame. Already the clinic studies on over 100,000 children have brought out the fact that school children are infected to the extent of 36 per cent in small communities and 24 per cent in those with a population over 5,000. And studies are now being conducted to determine the best way to deal with tuberculosis in infancy. It seems reasonable to suppose that if the plan inaugurated by the State Department of Health and developed under Chadwick is continued, the death rate from tuberculosis between adolescence and 40 will be cut down. As for the open pulmonary tuberculous case, standard methods of care have been developed and only intelligent and loyal coöperation is needed. Now to consider the nonpulmonary case. Over 30

per cent of patients at Lakeville State Sanatorium are there because they have been given milk to drink containing tubercle bacilli. Children generally drink milk and this raises the question of the milk supply. In cities generally the health administrations are more efficient and the milk distributed is less likely to contain tubercle bacilli than in the country. Why are not all diseased cattle killed? Because of the economic problem involved. The farmer expects that progress shall be as free from economic loss as possible and the State has to compromise; for we need milk and must depend on the dairy interests to produce it. Massachusetts is now spending large sums to eliminate this danger. Last year 9,000 cows were slaughtered and the owners partly reimbursed and the state is appropriating $400,000 to pay for this work, with some help from the federal government. Probably 35 per cent of cattle in this state are still diseased and the menace will not be thoroughly eliminated until all children can have all the wholesome milk needed. The city of Chicago now requires that no milk shall be sold except from tuberculosis-free cows and pasteurized. The price of milk has not been raised in consequence. Massachusetts has enacted a regulation that no unaccredited cow be introduced into a supervised herd. Eighty-three Massachusetts municipalities have milk regulations, most being to the effect that milk sold shall be either from nontuberculous cattle or pasteurized, but 355 municipalities, or about one-fourth of the population, is buying milk without these requirements. Among the counties, Barnstable has achieved excellent results and is among the most progressive of the smaller counties. Pasteurization alone can not cover all requirements because on a large scale it requires satisfactory apparatus and competent management. Among other lines of advance is better case reporting by the medical profession, and better local regulations and supervision.—*Some Considerations with Respect to Nonpulmonary Tuberculosis, W. P. Bowers, New England J. M., September 11, 1930, cciii, 529.*—(*A. P.*)

Protective Inoculation against Tuberculosis.—This is a historical review of the topic. The various attempts to immunize against tuberculosis are classed in three groups: *1:* Vaccination with living and virulent organisms (Koch, Webb and Gilbert, Selter, Moeller, Böhme, Behring). *2:* Vaccination with attenuated or avirulent living organisms (Friedmann, Calmette). *3:* Vaccination with killed organisms (Much, Langer). Attempts at passive immunization (Mafucci and di Vestra, Maragliano, Marmorek, Much, Löwenstein) have failed. It is concluded that immunization without infection is impossible, that the administration of living organisms is never without danger, and that killed organisms have only a weak effect.—*Schutzimpfungen bei Tuberkulose, E. Nobel, Wien. klin. Wchnschr., July 24, 1930, xliii, 929.*—(*M. P.*)

Pathogenicity of BCG.—Tests for the virulence of *Bacillus Calmette-Guérin* were made with a culture obtained from the Pasteur Institute. Twenty-eight guinea pigs and 18 rabbits were inoculated. To exclude previous infection, all animals were skin-tested with Old Tuberculin prior to inoculation with the *BCG.* Twenty-two out of 26 guinea pigs reacted positively to an intracutaneous injection of Old Tuberculin, after previous infection with the *BCG.* Ten out of 17 rabbits gave positive skin reactions after similar inoculations. Nine weeks after inoculation, 9 animals showed no lesions; in 12 others, the lesion was confined to the site of inoculation; and in 18 other animals lesions extended beyond the site of inoculation. This contradicts the claim of Calmette that the *Bacillus Calmette-Guérin* has completely lost its tuberculogenic property. It was concluded from these observations that the *Bacillus Calmette-Guérin* shows virulence and has not acquired the attenuation claimed for it, after long cultivation on bile-potato medium. It does not conform to the characteristics of a *virus fixe* in the sense of the Pastorian anthrax vaccines, because it may revert to its original virulent pathogenic state, and because the incubation period is indefinite, varying with the dosage and route of administration. Depending upon the amount of resistance met with in the animal organism, it either disappears from the system or leads to a process which, in some cases, terminates fatally.—*On the Pathogenicity of the Bacillus Calmette-Guérin, M. Malkani, Tubercle, July, 1930, xi, 433.*—(*M. E. P.*)

Protection of Calves with BCG.—Two hundred and eighty-two calves under 10 days of age were treated with *BCG* along with 15 older cattle. Of these, 192 were from an extensively tuberculous dairy herd and the remainder were from tuberculosis-free herds. Similar numbers have been carried as controls. *BCG,* in 100 mgm. subcutaneous doses, protected calves against lethal doses of tubercle bacilli when applied intravenously or subcutaneously. *BCG,* administered by feeding, has no advantages. Calves, having been "immunized," developed less extensive disease than controls when fed

with virulent bacilli, the duration of the latter process seeming to have no appreciable effect on the amount of disease. The degree of protection afforded by *BCG* is not sufficient to justify the use of the vaccine if other methods of eradication can be carried out, although it is believed to be of some help since it is "somewhat effective in protecting against a fatal termination of massive infection." *BCG* appears to be innocuous for cattle, swine, rabbits and guinea pigs. It is apparent that the strain at least delays the progress of tuberculosis. Details of this study are to be published by the Agricultural Experiment Station, University of California.—*Vaccination of Calves Against Tuberculosis with Calmette-Guérin Culture, BCG, C. M. Haring, J. Traum, F. M. Hayes and B. S. Henry, J. Am. Veterin. Med. Ass., March, 1930, lxxvi (n. s. xxix), 391.*—(*H. S. W.*)

Resistance of Guinea Pigs Vaccinated with BCG.—The adoption of any prophylactic measure in tuberculosis, especially when living organisms are employed, depends on whether the method under consideration is safe and free from any immediate or potential danger and on how much protection is obtained by its use. The present article attempts to correlate the resistance in guinea pigs vaccinated by various methods and then inoculated with a definite number of living virulent tubercle bacilli. In the first experiment guinea pigs, in groups of 12, were inoculated intraperitoneally with a suspension of living *BCG* culture, subcutaneously with the same, intraperitoneally with heat-killed tubercle bacilli (H37) and intraperitoneally with avirulent living bacilli (R1). Twelve guinea pigs were also kept under observation during the period of vaccination and were used as controls. Five weeks from the beginning of vaccination the 60 animals were inoculated subcutaneously in the inguinal region with 500 tubercle bacilli (H37) from a three-week-old synthetic-medium culture. The experiment was continued for 516 days. All vaccinated animals outlived the controls. As determined by the average days of life following infection, the resistance established by *BCG* vaccination was no greater than that in animals treated with heat-killed tubercle bacilli. The animals vaccinated with living R1 showed a slightly greater protection than either of the others. In the second experiment, 16 guinea pigs were inoculated subcutaneously with living *BCG* organisms, 16 with heat-killed H37 culture and 16 served as controls. Four weeks later the three groups received subcutaneously 250 living organisms (H37). This experiment was continued for 598 days. The dose of H37 was decreased for the reason that this strain is one of considerable virulence. In this experiment there was evidence of protection from *BCG*, but the degree was not greater than that produced when heat-killed bacilli were used. As far as vaccination was concerned, the third experiment was similar to the second, but the portal of entry of inoculating the virulent organisms was the testis and only 50 organisms were introduced. The animals vaccinated with heat-killed bacilli showed definitely more resistance than those treated with *BCG*. In the final experiment young guinea pigs were fed with living *BCG* culture and with heat-killed tubercle bacilli. No member of either group later reacted to intracutaneous tuberculin. All the animals, together with a group of controls, were infected by Baldwin's inhalation method. The suspension was prepared from a young H37 culture and each cubic centimetre contained approximately 5,000,000 organisms. Three puffs were given to each animal. The animals vaccinated by feeding developed as much disease as the controls and showed no perceptible immunity. *Conclusions:* Animals vaccinated intraperitoneally and subcutaneously with living *BCG* developed some degree of protection but no greater than that established with heat-killed bacilli. Guinea pigs vaccinated by feeding showed no allergy, or any perceptible immunity.—*Immunological Studies in Tuberculosis, vi. Resistance of Guinea Pigs Vaccinated with Bacillus Calmette-Guérin (BCG), S. A. Petroff and W. Steenken Jr., J. Immunol., July, 1930, cix, 79.*—(*J. S. W.*)

Misadventure with BCG in Lübeck.—The author was sent to Lübeck by the German *Reichsgesundheitsamt* in order to investigate the death of infants following the administration of *BCG* vaccine. In July, 1929, Calmette sent a strain of *BCG* to the director of the *Gesundheitsamt* in Lübeck. The same strain was given to 573 children in France, and it was used for vaccination in Mexico and in Riga. No untoward results were reported from any of these places. The strain, received in Lübeck, was transplanted at four-week intervals, first on bile-potato-media and on egg media; later on, only on egg media. The transplanting was done by a laboratory nurse who had done competent laboratory work for 17 years. The vaccines were prepared first by Prof. Deycke, who was the responsible leader of this work, and later on by the laboratory nurse. Calmette's directions were not followed, inasmuch as the transplants were not made on Sauton broth, and no separate room

was used for the work. Up to September, 1929, no virulent tubercle bacilli were kept in the laboratory, but at this time Deycke received a virulent human strain of tubercle bacilli from the Hygienic Institute in Kiel. This strain was kept in a separate incubator, which, however, stood in the same room in which *BCG* vaccines were prepared. In December, 1929, the first infant, born of a far-advanced tuberculous mother, was vaccinated. It developed cervical lymph-node tuberculosis. In the beginning of March, 1930, material from this lymph node and pure cultures of *BCG* were injected into guinea pigs. All animals died following the injection of 0.5 cc. of O. T. 41 days after the infection. While the animals infected with the lymph node showed "typical generalized tuberculosis," the *BCG* animals are reported as "no typical tuberculosis." Material from both groups of animals was transplanted into fresh guinea pigs; these were still alive at the time of the present report. They will be observed and examined in the *Reichsgesundheitsamt*. The administration of the vaccine was handled according to Calmette's directions. A total of 245 children received the vaccine; this represents about 50 per cent of all children born during the 60 days' period of vaccination. At the time of the report, 22 children had died; they had survived the vaccination from 33 to 82 days. On the 26th of April, after three vaccinated children had died, Prof. Deycke in a "condition of most terrible excitement" destroyed all vaccines in order to prevent any further administration. Postvaccinal cases of disease and death appear to be evenly distributed over all dates of vaccination and for all midwives administering the vaccines. The first signs of disease were stationary weight, meteorism, diarrhoea, swelling of cervical lymph nodes, increase in temperature. Soon, the spleen became enlarged, and roentgenograms showed hilar disease. Pemphigus-like eruptions were frequently observed. The period of incubation varied between 3 and 5 weeks. The severity of the clinical course did not go parallel with the length of the incubation period. Great individual variations were a striking feature; this may be explained by the fact that some children vomited part of the vaccines, and that others may not have received all three doses. The time of the day at which the vaccine was given may play a modifying rôle, since children who received it early in the morning before intake of food showed a greater mortality. With the exception of two, all children were autopsied. The postmortem examination revealed tubercles, varying in size, in all organs. With the exception of two cases, the meninges did not show any tuberculous involvement. As explanation of these unfortunate happenings, two possibilities must be considered: (1) The *BCG* strain in Lübeck reverted to virulence *in vitro*; (2) the *BCG* strain was confused or contaminated with virulent tubercle bacilli. In the face of 350,000 to 400,000 infants who received *BCG* in various countries without such fatal results, and considering that a large number of children have received vaccines prepared from the identical strain, without untoward results, the first possibility is rather unlikely. A definite judgment, however, must be withheld until all available evidence (bacteriological studies on postmortem material, inoculated animals, etc.) has been studied.—*Die Tuberkuloseschutzimpfungen in Lübeck, L. Lange, Klin. Wchnschr., June 14, 1930, ix, 1105.*—(*M. P.*)

Critique of Calmette's Statistics on BCG.—All the criticisms made by previous authors against Calmette's statistics are reiterated. It is pointed out that even the latest publication of Calmette contains grave statistical errors. The result of these erroneous methods is the uncertainty whether Calmette's vaccination is efficient or not.—*Kritisches zur Statistik über den Tuberkulose-Impfschutz nach dem Verfahren von Calmette, K. Freudenberg, Klin. Wchnschr., July 12, 1930. ix, 1320.*—(*M. P.*)

BCG.—This critical review begins with an historical account of prophylactic vaccination methods against tuberculosis. Then, the theoretical and experimental foundations of this method are discussed. It is mentioned that at a meeting of experts, called by the Hygiene Committee of the League of Nations, the general conclusion was reached that this vaccination is harmless; that, however, further work will have to decide whether it is effective. The author has shown in his own experiments that animals treated with *BCG* acquire a certain heightened resistance to a virulent infection. This is manifested by a more or less marked delay in the development of the disease, but not by a modification of the pathological processes. The favorable results, which were reported by Calmette and his associates with the immunization of monkeys, could not be confirmed by the author nor by other workers. The efficiency of the method for the protection of cattle is asserted by some workers, and entirely denied by others. In regard to the oral administration of the vaccine to infants, it has been questioned whether the bacilli are resorbed in all cases, since only about one-third of treated infants develop tuberculin allergy. Calmette asserts, how-

ever, that tuberculoimmunity may exist without tuberculin allergy. The only available proof for the efficiency of the method is the mortality statistics which Calmette published; these calculations have been severely criticized, and it is impossible to decide at the present time how much weight they deserve. Since it is easy to culture the *BCG* strain in uninterrupted animal passages (in the rabbit's cornea) it must be determined whether bacilli which actually multiply in the living animal will retain indefinitely their relative lack of virulence. There is evidence to believe that this is not so under all circumstances. It is concluded that the *BCG* vaccination should, at the present time, only be used on infants who must remain exposed to a source of tuberculous infection.—*Die Calmettesche Schutzimpfung, O. Kirchner, Klin. Wchnschr., July 12, 1930, ix, 1289.*—(*M. P.*)

BCG.—The points considered by the Commission were the following: *1:* Is *BCG* harmless? *2:* Is it effective? *3:* From the practical viewpoint how should the method be applied and the results collected? *4:* From the scientific viewpoint what points is it desirable to have further elucidated? *5:* Should the method be recommended by the Ministry of Health? *1: Is BCG Harmless?:* In Belgium since August 1, 1924, about 1,400 vaccinated children have been followed by the Institute of Bacteriology of Liége and no detrimental results found attributable to the vaccine. The same institution finds its nonvirulent characteristics to be fixed after repeated animal passages. Similar conclusions were reached by experts organized by the Committee of Health of the League of Nations, October, 1928. Publications confirming these conclusions are cited: *France*, Calmette and coworkers, Weill-Hallé and Turpin; *Italy*, Ascoli; *Holland*, van den Berg; *Sweden*, Malstrom; *Spain*, Friar, Muneyrro, Sayé; *Canada*, l'Institut d'Hygiène de l'Université de Montréal; *United States*, Park. Authors who have studied especially subcutaneous inoculation are Weill-Hallé and Turpin (Paris), Heimbeck (Oslo), Parisot and Saleur (Nancy), Gerard, Legendre, Mathis, Rousseau and others. Negative results on attempts to restore virulence were obtained by Kraus, Gerlach, Ascoli, Cantacuzene (Roumania), Kirchner and von Schroetter. Authors holding that under certain conditions *BCG* might not be harmless, were Lignières, Nobel, and Petroff. *2: Is BCG Effective?:* The results collected after four years by the Institute of Bacteriology at Liége showed a presumably tuberculous mortality of 1.9 per cent. The nontuberculous mortality was 8.3 per cent. Other statistics have shown that in the nonvaccinated brought up in a bacillary environment there was a general mortality in the first year of about 20 per cent (Falloise, van Beneden). Numerous similar results in vaccinated children are cited, the only authors reporting failures being Baigne, Lignières, Girod and Debarge (Geneva), and Taillens (Lausanne). *3A: Practical Application:* It is advised that the newborn be vaccinated orally and then isolated during the refractory period in a nursery institution (pouponnière). Commercial laboratories should not be allowed to handle the vaccine. *B: Collection of Results:* The hereditary antecedents of each child and his measurements at birth should be known; also what prophylactic measures (as to isolation) were taken and if repeated tuberculin cutireactions were made. The clinical and roentgenoscopic findings should be recorded and the later opportunities for contagion. In case of decease from presumed tuberculosis the means of confirming the diagnosis should be known. All details of necropsies and guinea pig inoculations should be reported, together with the means taken to distinguish virulent tubercle bacilli, *BCG* and the "ultravirus." *4: Scientific Desiderata: 1:* The conditions of appearance and disappearance of the tuberculin reaction in vaccinated subjects should be studied. *2:* The rôle of congenital or acquired debility on an organism inoculated with *BCG* should be studied. *3:* The rôle of intercurrent infections on the same factor. *4:* The eventual rôle of transplacental ultravirus infection in vaccinated subjects. *5:* The optimum age and condition for revaccination. *6:* The ideal statistical method to be followed in reports. *Summary of Report: 1:* Is *BCG* harmless and can its use be recommended? The answer is yes. *2:* Is *BCG* effective? So far the answer is yes. It seems to reinforce resistance to infection. Whether this lasts up to adult age has yet to be determined. *3: Practical Application:* The commission believes it best to reserve this vaccination for the issue of tuberculous parents or those born amid contaminated surroundings. To vaccinate all the newborn seems premature. Also, it is none the less desirable that the vaccinated child be removed as soon as possible from the source of contamination lest massive infection break down his acquired resistance. Nursery institutions should be created in each province or in the larger cities and industrial centres to receive the newborn who are in danger of contamination, for vaccination and surveillance of at least a month. These nurseries should be closely related to the maternity institutions

and the prenatal consultation service of the *Oeuvre Nationale de l'Enfance*, visiting nurses and other organizations related to child welfare. The vaccinated child should remain under surveillance by the *Oeuvre Nationale* until adult age. If the vaccinated child cannot be placed in such an institution as mentioned he should at least be separated from the contaminated environment for at least three months.—*Vaccination Anti-tuberculeuse par methode Calmette-Guérin (A) Premier projet deposé par le rapportant Docteur J. Van Beneden, (B) Rapport de la Commission d'études sur le BCG., Rev. Belge d. l. Tuberc., May-June, 1929, xx, III.*—(*A. P.*)

BCG.—Calmette's previously published reports omitted the 49 dispensaries of the *Office Public d' Hygiène Sociale* of the Seine, the figures then being incomplete. Since then Kaletcheff has collected data on children vaccinated from 1925 to 1927 and investigated the causes of death up to the end of 1928. Among 49 dispensaries of the Paris district and vicinity 1,727 observations were collected, of which 1,404 concerned children in permanent tuberculous contact and 323 children born of tuberculous parents but separated from them. Of the 1,404 contacts, 535 were born of tuberculous mothers and 659 of tuberculous fathers, while 38 had both parents tuberculous. Of the entire group, 1,164 survived up to the end of 1928, while 240 died. This mortality of 12 per cent is lower than the general mortality of the unvaccinated under similar circumstances, which is 21 per cent. The vaccinated children do not come from families better situated or more carefully supervised. In fact, in this particular office vaccination was rarely requested and was done more often on the premature and delicate-looking children than on the apparently vigorous. All these facts go to indicate the innocuousness and effectiveness of *BCG* for young infants exposed to tuberculosis. Renault, having observed numerous infantile deaths from tuberculous meningitis in the Hôpital St. Louis, was convinced that children not directly from tuberculous families should also be protected and many obstetricians and pediatricians have concurred, so that since July, 1924, over 152,000 children have received the vaccine without any untoward results. A case is cited of two children vaccinated at birth, who were later unwittingly exposed to a tuberculous wet-nurse, yet remained entirely healthy, illustrating the unexpected sources from which infections may arise.—*Résultats de la vaccination prêventive de la tuberculose par le BCG pratiquée dans les dispensaires de l' office public d'hygiène sociale de la Seine en 1925–1927 et 1927, A. Calmette, Rev. Belge d. l. Tuberc. May-June, 1929, xx, 107.*—(*A. P.*)

BCG.—The author records the death of a one-half-year-old child that died of gastro-enteritis, 3 months after *BCG* inoculation and the question was raised whether the child had not died of tuberculosis, the resistance having been diminished by starvation or by the alimentary infection. It is believed that tuberculosis can result from *BCG* inoculation, especially when the inoculated individual is suffering from other diseases, such as infectious gastrointestinal catarrh. Experiments in rabbits are recorded which were infected subcutaneously with 1 mgm. of human bacilli, which produced no disease except in one animal with gastroenteritis. Postmortem of all these animals revealed only a tuberculous focus at the site of injection, with the exception of the animal that died, in which case fresh productive lesions were found in the lung and liver.—*Einiges zur Tuberkulose-Schutzimpfung mit dem BCG, K. Henius, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 801.*—(*H. J. C.*)

BCG.—Intraperitoneal and subcutaneous injections of 5 mgm. of *BCG* were given to guinea pigs that were killed after 5½ to 8 months. In only 4 of the 10 animals inoculated could *BCG* be found at this time. These animals revealed only acid-fast granules and occasionally one or two acid-fast rods.—*Über das Schicksal des "BCG" im Organismus, W. A. Lubarski, Zeitschr. f. Tuberk., 1929, liii, 427.*—(*H. J. C.*)

BCG.—*BCG* was found to be of low virulence for guinea pigs, and produced only insignificant lymph-node inflammation and changes in parenchymatous organs, with abscess-formation in individual cases. Microscopically, there were found fuchsin-stained granules and only rarely Ziehl-stained rods. Animal passage of the abscess material as well as of that showing pathological changes produced no changes in guinea pigs. *BCG* had very slight vaccinating properties for guinea pigs, and did not protect them against virulent tubercle bacilli, but there was some inhibition of development of the tuberculous process in the vaccinated animal. Tubercle bacilli, exposed to the action of olive oil and lecithin, produced the same changes in guinea pigs as *BCG*, and the cultures became more avirulent. The use of *BCG* for vaccinating children against tuberculosis is approved.—*Das experimentelle Studium des Stammes "BCG" im Zusammenhang mit der Einwirkung lipoidhaltiger Stoffe auf die Tuberkel-*

bacillen, M. Isabolinsky and W. Gitowitsch, Centralbl. f. Bakt., I Orig. 1929, cxii, 35.—(H. J. C.)

Constitutional Anomalies of Thorax and Diaphragm.—Although the shape of the thorax varies greatly within normal limits, it is possible to differentiate certain types as constitutional anomalies. These may be part of a systemic anomaly, or they may be restricted to the thorax only. In infantilism the thorax retains throughout life the proportions which are normal for the infantile chest: the upper aperture is in almost completely horizontal position, the ribs take a more horizontal course, the sagittal diameter is relatively large; the whole thorax imitates the shape which it assumes normally in inspiration. The infantile thorax is very similar to the emphysematous thorax. In this way the constitutional anomaly of an infantile thorax may predispose to the development of emphysema, especially when frequent bronchitides occur in such a chest. Another constitutional type with a well-defined anomalous chest is the asthenic type. It is characterized by a long neck, sloping shoulders, steeply inclined upper aperture, flat chest, acute costal angle, slanting ribs, slight kyphosis, and prominent scapulae. The pulmonary volume in these individuals is very large, the heart is small, and the blood-vessels are narrow. The extreme narrowing of the upper aperture is due, according to Freund, to an extraordinary shortness of the first rib. This anomaly produces an impairment of respiratory and circulatory functions in the apical portions of the lung, rendering these parts, presumably, hypersusceptible to tuberculosis. The fact that the greater regularity of apical localization is a feature of adult tuberculosis only is quite consistent with this concept, since it is only at adult age that the apices ascend considerably above the first rib. Wenckebach pointed out that different types of thoraces seem to predispose to tuberculosis in different racial groups. He found in Holland a close correlation between asthenic thoraces and tuberculosis. In Strasbourg, however, he found much tuberculosis but no asthenic thoraces. The fact that the Teutonic and Romance types hardly ever show the asthenic build explains the fact that Freund's theory never found acceptance by French clinicians. Wenckebach is convinced that the asthenic habitus is a racial characteristic. It is not consistent that Freund claimed good therapeutic results by mobilizing the thorax, while recent years have convincingly shown the therapeutic benefits from immobilizing operations. The long asthenic chest with its low diaphragm establishes unfavorable conditions for the circulatory system. The contraction of a low diaphragm tends to diminish the intrathoracic volume by pulling the lower portions of the thoracic cage inwards. This condition may cause an over compensation in the upper parts of the thorax, producing the *thorax piriformis* of Wenckebach. Constitutional anomalies of the ribs, such as variations in their number, rarely cause clinical symptoms; the same is true of constitutional anomalies of the sternum. The anomalies of the diaphragm are usually in correlation with those of the thorax, such as its low position in asthenic individuals. An abnormally high diaphragm is occasionally seen in individuals beyond the prime of life, who complain, in the absence of organic disease, of palpitation and anginoid symptoms.—*Konstitutionsanomalien des Thorax und des Zwerchfells, K. Hitzenberger, Wien. klin. Wchnschr., March 20, 1930, xliii, 367.—(M. P.)*

Pathogenesis of Tuberculosis.—A review of classical and modern ideas of the origin, pathology, and treatment of pulmonary tuberculosis comprises the third article in the series dealing with the pathogenesis of tubercle. In refuting the idea that the usual mode of progress in pulmonary lesions is from an apical focus, statistical studies first revealed the fact that only 7 per cent of apical lesions developed into progressive pulmonary tuberculosis. It was then frequently observed that there was a certain group of patients who showed pneumonic infiltrations in the infraclavicular region, quickly followed by absorption or cavity-formation. The clinical symptoms were those of influenza and a characteristic feature was that the apices usually were clear. To this type of lesion, the term "initial infiltration" was given and Redeker is its most consistent exponent. Among 117 cases of initial infiltration, he found the distribution as follows: Infraclavicular, 58; middle zone, 38; lower zone, 15; subclavicular, 4; apical, 2. Clinically, the initial infiltration does not usually give physical signs. Pathologically, the various types of infiltration, including initial infiltration, are as follows, according to Redeker: *1:* Primary infiltration, occurring as an extensive perifocal inflammation around the primary focus. This is seen in babies and rarely in adults. *2:* Secondary infiltration, an acute inflammation forming around an old focus in the lung, frequently appearing in the neighborhood of the hilum. *3:* Initial infiltration, a tuberculous superinfection, in the strict sense. Its central focus is in the bronchus of a patient previously infected, and implies greater danger

of bronchial dissemination than found in secondary infiltrations around an old focus surrounded by dense connective tissue. It suggests a new phase, the evolution of phthisis. *4:* Daughter infiltration, arising from infectious material from a pulmonary focus being aspirated into another section of lung. *5:* Late infiltration, distinguished from a daughter infiltration by the occurrence in a section of lung already affected. The distinction between these types of infiltration are subtle and do not seem to convey any material increase in knowledge.—*Some Recent Continental Views on the Pathogenesis of Tubercle, E. Zimmerli and F. A. H. Simmonds, Tubercle, May, 1930, xi, 345.—(M. E. P.)*

Pathogenesis of Tuberculosis.—The clinical manifestations of the primary infection are, as a rule, so slight that they escape clinical detection, but the beginning of the disease should be dated with the primary infection. The period between actual infection and the appearance of allergy is the incubation period. Since it is only rarely possible to determine the exact time of the infection, the length of the incubation period is not very definitely known. As soon as allergy is developed, an "initial fever" may occur. It usually lasts six to twelve days. It is associated with moodiness, fatigue, and loss of appetite. There may be loss of weight and disturbances in the gastrointestinal function. Cough may be present. The regional lymph nodes may be demonstrable roentgenologically. The most striking symptom of this period is erythema nodosum. This occurs, particularly, in patients with a high allergy. In 10 per cent of patients the erythema nodosum was followed by tuberculous meningitis. Whenever the diagnosis of a primary infection can be made, a strict rest-cure should be instituted, and one should search for possible sources of infection.—*Der Beginn der Tuberkuloseerkrankung, H. Koch, Wien. klin. Wchnschr., January 23, 1930, xliii, 117.—(M. P.)*

Tissue Reactions to Lipoids.—The ears of pigs were found especially suitable for tissue reactions following the intracutaneous injections of various substances. The animals were treated by "Promonta" feeding and by means of the subcutaneous injection of nonspecific lipoid mixtures. Intracutaneous testing was performed 4 months after the conclusion of the treatment. Two fat-lipoid partigens of the tubercle bacillus were tested. The "Promonta" fed animals reacted markedly to these injections. Tuberculoid reactions followed the partigen N, but only in one animal after blood lipoid. In another series pigs were injected with cholesterin and lecithin subcutaneously, and into the ear with partigen F and N in a dilution of 1–200, as well as with cholesterin and lecithin mixtures. A wide range of reactions resulted, from tubercle-formation to giant cells, and also nonspecific reactions. It is concluded that tubercle-formation can occur in the skin of healthy pigs from bacillary lipoids. The reaction is not solely one of a foreign-body action, but is relatively specific since it occurs in dilutions of 1–1,000. It is especially noted that there is an individual reactive ability of the animals which can interfere with irritating properties of the individual substances.—*Experimentell-immunbiologische Untersuchungen an der Schweinehaut über die Erzeuzung von Tuberkeln und tuberkuloiden Strukturen bei gesunden Tieren durch Einsprilzung von Lipoiden, A. Haim, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 269.—(H. J. C.)*

Epithelioid Cells as Foreign-Body Reaction.—Until recently the epithelioid cell could be specifically recognized only when found in numbers either in definite tubercles or in generalized tuberculous tissue. Due to certain criteria established by Cunningham, Sabin, *et al.*, based upon the study of the living cell, the individual epithelioid cell is now capable of specific identification even when entirely dissociated from the lesion of which it formed a part. These authors also suggested that the epithelioid cell was a specific derivative from one type of phagocytic cell, the monocyte, which occurs quite generally in connective tissue, and that the production of epithelioid cells in tuberculosis is initiated from within the cells by the presence of ingested tubercle bacilli. Recently it has been shown that similar cells can be produced in great numbers by means of the phosphatide fraction and a dextrorotary fatty acid obtained from tubercle bacilli by chemical extraction. It was not determined, however, whether these substances exert their actions from within the monocyte, or whether they act upon it from the outside. The present article has to do with the results obtained by the subcutaneous inoculation of phosphorus in oil. Guinea pigs were used for these experiments. From 0.5 to 1.0 cc. of olive oil containing 1 mgm. of yellow phosphorus per cc. was injected subcutaneously. After various intervals (from four to nine days) the area was incised and scrapings of the fresh tissue were studied supravitally. Also, very small films of tissue were removed and spread on slides for study. These examinations were made on slides previously coated with neutral-red. Where the tissue was not sufficiently moist,

a drop of serum was added in order to obtain a preparation with sufficient fluid to insure a solution of the dye. In these experiments it was found that large numbers of typical epithelioid cells were produced. In addition, typical Langhans giant cells were often found, and great numbers of cells whose nature could not be determined further than that they were probably epithelioid cells which had undergone degeneration. From these observations, no definite information concerning the aetiology of epithelioid and giant cell was obtained. It is only pointed out that such cells, wholly indistinguishable, from those found in tuberculous reactions can be produced as described.—*The Formation of Epithelioid Cells and Giant Cells in the Subcutaneous Tissue, Following the Introduction of Phosphorus in Oil, R. S. Cunningham, E. H. Tompkins and J. S. Lawrence, Bull. Johns Hopkins Hosp., May, 1930, xlvi, 323.*—(*J. S. W.*)

Defense of Ranke's Teachings.—In recent discussions about the onset of pulmonary tuberculosis, many authors have stated that Ranke's concepts are incorrect, but a critical analysis shows that such statements are largely due to a lack of familiarity with Ranke's own writings. The essential foundation of Ranke's concept is the attempt to subordinate the processes occurring in individual foci under the total reactions caused by the interplay between host and microörganism. The primary complex is the anatomical manifestation of this interplay following the first contact between host and bacilli. The astounding regularity with which this focus terminates in sclerotic encapsulation and its uniqueness in the total development of tuberculosis justify Ranke's assumption of a particular biological "attitude" governing this issue; this "attitude" or this form of biological reaction is termed by Ranke, "Allergy I." The principle is not invalidated by the fact, pointed out by Ranke, that bacteriaemia may occur (or seems to occur regularly in experimental animals) during this primary period. Anything that may happen after the primary infection has occurred is modified by the fact of the previous infection. In this regard, Ranke places the emphasis on the mode of propagation; the structural peculiarities of individual foci are but of secondary significance. The postprimary developments may either lead to generalizing processes or to processes limited to one organ-system (*isolierte organphthise* in Ranke's words). The former (generalizing) processes presuppose such a biological type of reaction which permits the development of haematogenous or lymphogenous metastases of clinical significance. This type of reaction is termed by Ranke, "Allergy II." While massive haematogenous and lymphogenous metastases are definite criteria of the Allergy II, Ranke has repeatedly stated that during the secondary period spread may occur, too, through preformed channels (that is, intracanalicular spread by way of bronchi, intestinal canal, urogenital canal, etc.), and by continuous growth. Secondary lesions are not by necessity acute, the same as tertiary lesions may be acute or torpid. A further systemic characteristic of the secondary stage is the tendency to relatively large circumfocal infiltrations. The tertiary stage, the manifestation of Ranke's "Allergy III," is characterized by a lessened susceptibility for humoral metastases. How much, in Ranke's viewpoint, the entity overshadows the single process becomes particularly apparent in his idea of the tertiary stage: here, an entire organ may be involved, such as a lung or kidney, but as a rule humoral metastases of importance are absent; it is this resistance to metastases, and not the localized destruction, which characterizes the Allergy III. It has been a common mistake in recent writings to seek for the characteristics for each stage in individual lesions instead of in the totality of the disease manifestations. The continuous alterations in single foci from acuteness to chronicity, from activity to latency, from progression to retrogression, and standstill, have nothing to do with the alternating allergic phases in Ranke's concept. The attempt to explain such alterations on the basis of Ranke's teachings must result in failure and has—unjustifiedly so—discredited his teachings. It should be emphasized in particular that the frequent attempt to correlate exudative processes with the secondary stage, and productive ones with the tertiary stage have no support by Ranke. Ranke intended to describe with his concepts the "normal" development of tuberculosis, that is, by necessity a guiding principle and not a pathological or clinical description of the individual case or a single focus; all genotypical and phaenotypical factors may enter into the picture as modifying influences. The leading principle is not the personality-form of a given patient, but the reaction caused by the infection, regardless of personal modification. It must be asked whether it is possible—clinically or pathologically—to differentiate a pulmonary tuberculosis of the second stage from one of the tertiary stage. Ranke's secondary stage (of humoral generalization) comprises only such cases in which massive or progressive metastases are developed, and not those with abortive tubercles in some internal organs and lymph nodes. The

author observed 50 cases of generalized (secondary) tuberculosis at necropsy. The peculiarities of the pulmonary lesions in these cases were as follows: There are even miliary seedings, which are frequently due to lymphangitic involvement, evenly distributed emphysema, gelatinous pneumonia (*glatte Pneumonie*) around necrotic, apparently haematogenous foci, clean, sharply cut small cavities, circumscribed scleroses in apices and in the lobar edges. The frequency of intracanalicular metastases is much less in generalized forms; laryngeal tuberculosis was more than three times, and intestinal tuberculosis almost three times as frequent in tertiary forms. As far as the much discussed incipiency of pulmonary tuberculosis is concerned, the following conclusions are reached: Initial foci in the apical and subapical regions may develop by bronchogenic or haematogenous spread. The latter are clinically recognized as *tuberculosis milaris discreta* or *tuberculosis fibrosa densa* (W. Neumann). They may (probably infrequently) give rise to a progressive pulmonary tuberculosis by bronchogenic propagation. Caseous bronchitic foci in the apices are more likely due to an exogenous inhalation infection. Infraclavicular foci must be considered to be of haematogenous origin, when they occur in cases of generalizing tuberculosis. The so called Puhl foci are mostly bronchogenic metastases from caseous bronchitic lesions. Infraclavicular foci which develop in the absence or independently of apical foci are more likely of exogenous origin. The most typical and most frequent "early infiltration" is a bronchogenic spread from bronchogenic apical foci; it is, then, a tertiary lesion.—*Der Beginn der Lungentuberkulose und die Rankesche Stadienlehre, W. Pagel, Klin. Wchnschr., January 11, 1930, ix, 51.*—(*M. P.*)

Frequency of Early Infiltration.—Although the existence of the clinical and pathological entity "early infiltration" is established as a well-recognized fact, a uniform explanation of its genesis is not generally accepted. Certain authors (Rieder and Assmann) emphasize the characteristics of localization (infraclavicular infiltration); others (Dietl) characterize it as the formation or acute exacerbation of primary foci; a third group (Grass, Redeker, Romberg, Lydtin) define the typical lesion in terms of circumfocal inflammation. The same discrepancies exist in definition. According to Redeker an early infiltration is a localized, intrapulmonary, circumfocal inflammatory infiltration, which must be interpreted as a reaction of the previously uninfected parenchyma (locally) against a tuberculous reinfection. Assmann defines it as a typical form of isolated tuberculous pulmonary foci in the clinical incipiency of the disease, most frequently localized in the infraclavicular region. No agreement exists on the question of which types of lesions should be included in this term. The confusion in this regard exists because some authors use the term "early infiltration" to designate only the most incipient stages of these foci, while others include foci which show the later changes of fibrosis, excavation and bronchogenic spread. Some authors stipulate that the term should be used for only such lesions that are not associated with older (tertiary) lesions; other writers call all early infiltrations recent focalizations of characteristic appearance, regardless of the absence or presence of other foci. It is suggested that we reserve the term "early infiltration" for such foci which, in the absence of tertiary lesions, mark the clinical inception of the disease, and to use the term "infiltrative tuberculosis" for foci of the same roentgenological characteristics that occur in the presence of older lesions or are complicated by bronchogenic spread or fibrotic changes (induration fields). Since no agreement exists on the use of the term, it is impossible to compare the various reported statistics on the frequency of this lesion. During the last two years, 1,285 patients were observed in the sanatorium; 1,075 of these had pulmonary tuberculosis, and 984 were active and in need of treatment. During their observation in the sanatorium 486 had bacilliferous sputum, and 229 were cavity-bearers. In 624 cases infiltrative lesions dominated. In 40, or 4.06 per cent of all active cases, an early infiltration, as defined above, was observed. The fact that out of a total of 984 active cases, 63.4 per cent had to be classified as "infiltrative tuberculosis" emphasises the importance of recurrent infiltrations in pulmonary tuberculosis.—*Die Häufigkeit des Tuberkuläsen Frühinfiltrates in Fürsorgestellen, Heilstätten und Krankenhäusern, H. Deist and W. Burmeister, Klin. Wchnschr., June 28, 1930, ix, 1224.*—(*M. P.*)

Course of Early Infiltrations.—A series of 11 cases of early tuberculous infiltration occurring in adults of early middle age are reported. The onset was indefinite. The skiagrams of these patients showed the area of infiltration often with cavitation. They did not show small bronchopneumonic patches around the initial lesions. The lesions progressed slowly, thus conforming to the usual course of the disease in older patients.—*The Course of the Early Infiltration in Adults of Early Middle Age, H. V.*

Morlock, Tubercle, January, 1930, xi, 148.—(W. I. W.)

Roentgenology of Secondary Infiltrations during School Age.—The separation of primary and secondary infiltrations is difficult. In an examination of 2,219 school children, 212, or 9.6 per cent, were found with secondary infiltration. The isolated pulmonary infiltrations are far fewer than the hilum infiltrations, indicating the significance of the bronchial lymph nodes in the development of pulmonary tuberculosis. The infiltrations are found predominantly in the right lung, coinciding with the more frequent right-sided primary infections. Secondary infiltrations in the lung are predominant roentgenologically in the midfields of both sides in boys and girls. Among the interlobar areas the small fold between the middle and upper lobe is most frequently affected. The interlobar changes are fibrous, fibrinous, and exudative. Frequently pulmonary and interlobar disease are combined. Pure mediastinal pleurisies are rare. A transition of acute infiltrations into lobular caseous tuberculosis or caseous pneumonia was not seen.—*Grundsätzliche und statistische Erörterungen über den röntgenologischen Nachweis pulmonaler Sekundär-Infiltrierungen im Schulalter, K. Nüssel, Zeitschr. f. Tuberk., 1929, liv, 1.—(H. J. C.)*

Healing by Resolution in Pulmonary Tuberculosis.—In addition to fibrosis and calcification, healing in pulmonary tuberculosis may take place by absorption of the lesion without leaving any scar or sign of preëxisting disease in the lung. Resolution only occurs in the exudative type of lesion before caseation has taken place; in other words, when the process is pneumonic or bronchopneumonic. In the mixed types of lesions, the exudative elements are absorbed and the productive elements are replaced by fibrous tissue. Spontaneous absorption occurs more readily when the patient is placed under a strict sanatorium regimen.—*Processi atipici di regressione della tubercolosi polmonare, G. Luzzatto Fegiz, Tubercolosi, xxi, July, 1929, 259.—(U. E. Z.)*

Healing of Cavities.—The author describes a series of cases, observed over a long period of time, from which he concludes that the annular shadows found were thin-walled cavities, with a marked tendency toward transformation and, under unfavorable conditions, an equally rapid recurrence. Of considerable importance in the evaluation of these cases is the behavior of the bronchi and especially the finding of bacilli. Too little consideration is given the latter especially. Early pneumothorax is advocated for these cases.—*Neue Deutungen der Kavernenheilung, W. Bronkhorst, Beitr. z. Klin. d. Tuberk., 1929, lxxii, 36.—(H. J. C.)*

Healing of Advanced Pulmonary Tuberculosis in Prize Swimmer.—The author found in an 18-year-old prize swimmer, examined before a contest, the clinical and roentgenological features of an active bilateral tuberculosis. The patient had a family hazard but never suffered any symptoms. On account of the psychical danger in forbidding continuance of the sport this was not done and the subsequent history showed that in spite of activity there was a retrogression of the disease.—*Spontanheilung ausgedehnter Lungenherde bei einer Wettschwimmerin, E. Nervegno, Zeitschr. f. Tuberk., 1929, liv, 46.—(H. J. C.)*

Pulmonary Cavities.—There is evidence indicating that a positive pressure of gas within an area of softening or within a definite cavity already formed helps to produce excavation. A case is reported in which a hollow needle was introduced safely straight into a large apical cavity. This needle was then attached to the ordinary manometer of a pneumothorax apparatus and a positive pressure of 16 centimetres of water was recorded. From this cavity gas was extracted and the pressure was reduced several centimetres.—*The Pathogenesis of Pulmonary Cavities, S. V. Pearson, Brit. M. J., March 1, 1930, no. 3608, 380.—(W. I. W.)*

Calcification of Tubercles.—Through the studies of a number of men working with the artificial production of vitamine D it has been generally accepted that the specific substance activated by irradiation is ergosterol. The administration of massive doses of this activated substance to normal animals produces an elevation of the blood calcium and the deposition of calcium in the tissues, the liver and striated muscles being exceptions. It seemed of interest to study the question in relation to tuberculosis produced in rabbits, since these animals are especially susceptible to the effects of ergosterol. Each of 25 rabbits was inoculated intravenously with 1 cc. of a heavy saline suspension of virulent bacilli of bovine tuberculosis. To 14 of these animals a concentrated preparation of activated ergosterol was administered by stomach-tube every one to three days in doses of 3 to 5 cc. To 6 of the animals the inert solvent oil was given and 5 remained as controls. All animals were allowed to die. The tissues were fixed in suitable fluids and appropriate staining technique was utilized to show calci-

fication or the presence of tubercle bacilli. On pathological examination, the lungs and kidneys showed tubercles, while in 5 of the animals receiving ergosterol the aorta showed gross changes. Tissues fixed in formalin showed calcium deposits in the centre of caseous or necrotic tubercles, but there was no apparent change in the size, shape or cellular content of these tubercles. Five of the animals died early, having received but one dose of ergosterol; in these calcification was absent. Seven of the animals showed calcification in the kidneys, and here again it occurred in the necrotic portions. In general the tubercles in the kidneys were smaller and contained fewer areas of necrosis and fewer and smaller deposits of calcium. The aorta of 5 of the animals contained calcium deposits in the media. The control animals showed tubercles in the kidneys which contained no precipitated calcium, and their aortae were normal. Tissues fixed in Zenker's fluid were decalcified and at most showed a bluish zone where calcium had been deposited. It is to be noted that tubercles which were free from necrosis did not contain calcium. Massive and repeated doses of irradiated ergosterol are toxic to normal animals. Clinical application of the facts reported is therefore dangerous. *Summary:* The administration of repeated large doses of activated ergosterol to rabbits suffering from acute tuberculosis causes extensive deposition of calcium salts within the caseous lesions. The administration of a single large dose produces no demonstrable change. It is suggested that a high vitamine-D diet might possibly be useful in some cases of pulmonary tuberculosis.—*The Calcification of Tubercles by Means of Irradiated Ergosterol, T.D. Spies, Am. J. Path., May, 1930, vi, 337.*—(*R. D.*)

Perifocal Haemorrhages in Tuberculosis.—The author reports a case of erythema induratum, complicated with purpura, in which there were perifocal and intrafocal haemorrhages. Vascular injury, stasis and toxic irritation is believed to cause the haemorrhagic forms of skin tuberculosis. The haemorrhage is viewed as a response to a tuberculin irritant. Tuberculin, given in the form of intracutaneous superinfections, also cause haemorrhages in animal experiments. Perifocal haemorrhages were also seen in tuberculous pigs.—*Über perifokale Blutungen bei Tuberkulose, Lotte Simonsen, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 467.*—(*H. J. C.*)

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